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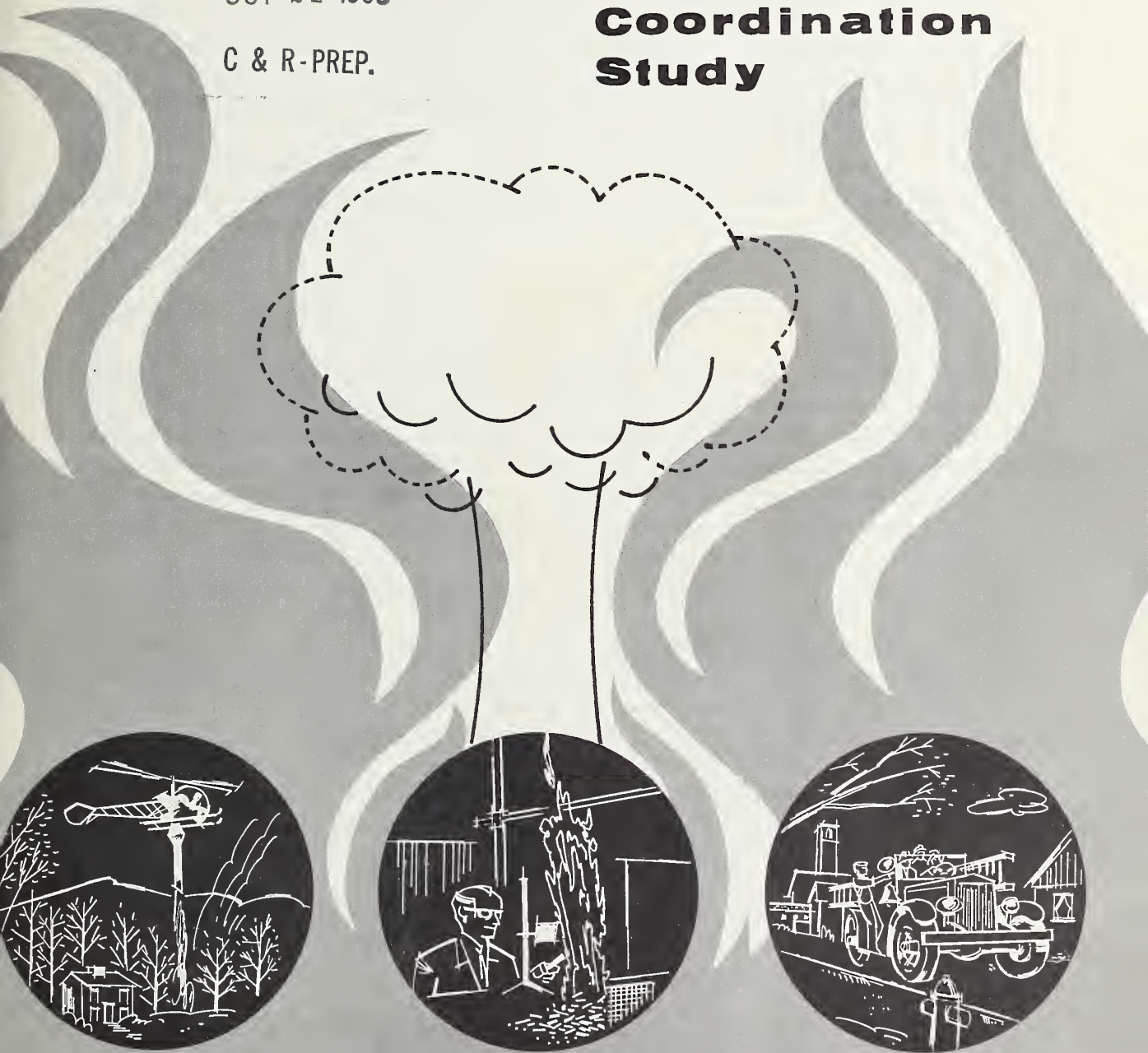
Fire Defense In The United States

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National Fire Coordination Study



FIRE DEFENSE IN THE UNITED STATES

BACKGROUND

The Division of Fire Control in the United States Forest Service, at the request of the Office of Civil Defense, is conducting a study to: (1) Review pertinent research findings and define the nuclear fire problem; (2) Recommend a nationwide fire defense program, including alternatives, for the Office of Civil Defense; and (3) Recommend how the several parts of the fire defense program should be implemented. Phase One of this study has been completed and a report^{1/} published containing the analytical results and recommendations for (1) and (2) above. A report to be prepared at the conclusion of the study will contain more comprehensive information about the fire defense problem and recommend ways to carry out the program approved by the Office of Civil Defense.

RURAL-URBAN FIRE DEFENSE PROBLEMS WERE STUDIED

Meetings were held in Los Angeles, Portland, Chicago, Boston, and Memphis early in the study. Urban and rural fire leaders and other interested persons were briefed at these meetings. Many worthwhile ideas were developed. Related operational studies made in the past were reviewed and their recommendations considered. Samples of present day fire planning and readiness activities were obtained by studying fire mutual aid arrangements in California, Oregon, Michigan, Massachusetts, and the Washington, D. C. Metropolitan Area.

Tactical fire control practices and problems were examined and related to defending fallout shelters by studying large fires. Fires studied are: Park Headquarters Fire, South Dakota, 1964; General Dynamics Fire, Bayonne, New Jersey, 1963; Nevada Fires, 1964; Roseburg Explosion and Fire, Oregon, 1959; Deadwood Fire, South Dakota, 1959; Coyote Fire, California, 1965; Bellflower Street Fire, Boston, Massachusetts, 1963; Morgan Memorial Fire, Boston, Massachusetts, 1963; Codman Square Fire, Boston, Massachusetts, 1963; Charlestown Fire, Boston, Massachusetts, 1962; Santa Rosa Fires, California, 1965; Russwood Ball Park Fire, Memphis, Tennessee, 1960; Los Angeles Civil Disturbance Fires, 1965.

^{1/} The Phase One Report of the National Fire Coordination Study is available from the Clearinghouse for Federal Scientific and Technical Information, 5285 Port Royal Road, Springfield, Virginia 22151 at a cost of \$5.00 per copy.

Nuclear attacks of varying weights and types were hypothetically employed upon the United States. Pertinent research findings were applied to the attacks, and the resultant fire problem defined. From the beginning, fire experts from urban and rural Fire Services, fire supporting organizations, and fire educational organizations helped the Forest Service staff with the study. Thus research in the field of nuclear fire, damage inflicting capability of potential enemy attacks, information from the mutual aid and large fire studies, and the thinking of many fire leaders across the Nation have been joined to analyze the problem and recommend solutions.

FIRE WOULD CREATE A SERIOUS THREAT TO LIVES AND RESOURCES IN A NUCLEAR ATTACK

Damage from a nuclear attack would be caused primarily by blast, radioactive fallout and fire. Biological and chemical agents could also be included but these have not been considered in the fire study. Blast is a static agent, capable of creating terrible destruction in the area where the warhead is detonated but incapable of spreading beyond the area of initial effects. Radioactive fallout and fire are not only capable of inflicting damage in the area effected by blast, they can spread from the area to threaten additional lives and resources. Fires in a nuclear attack would be started by thermal flash from the detonation of warheads and by broken power lines, overturned stoves and similar disruptions resulting from the blast.

Climate and weather factors, spacing and flammability of fuels, and to a lesser extent topography, all influence the ignition and spread of fire. The most serious fire threat would develop from numerous small fires, ignited by thermal flash and blast disruptions, burning together and creating large fires capable of threatening fallout shelters and needed resources.

Because lethal doses of radioactive fallout from a nuclear attack could cover large geographical areas of the United States, the fallout shelter program has been recognized as the most fundamental life saving measure in Civil Defense. It is necessary to give these shelters the best possible protection from fires starting within the shelter, spreading from other buildings, or spreading from forest fuels to threaten the shelter. The National Fire Coordination Study shows that, depending on weather conditions and weight and nature of the attack, as much as 10% of the land area of the United States could burn. Communities and resources needed for the Nation's recovery would be threatened.

Spreading fires could threaten some fallout shelters and force survivors to defend their shelters or, if defense is unsuccessful, to expose themselves to fallout to escape the fire. Figure 1 relates the land area burned to that covered by fallout if an attack occurred on the United States during a bad fire day in August.

WARTIME FIRE DEFENSE WOULD DIFFER FROM PEACETIME FIRE CONTROL

The most serious complication introduced by modern weapons is the^{1/} threat of fallout that could hamper firefighting or movement of people^{1/}. The presence, anticipated presence, and duration of radioactive fallout would control the timing of any activities outside the protection of fallout shelters. Broken water mains and rubble would reduce the effectiveness of conventional firefighting equipment. Fires would be so numerous in some areas that available trained firefighting forces would be quickly overwhelmed if they attempted to control all fires. These constraints indicate cleaning up combustible materials, covering ignitable home furnishings, and citizens action to put out small fires to be important additions to organized fire department capability.

Disaster areas created by a nuclear warhead, or group of warheads, would be so large that urban and rural fire forces would be joined together - much oftener than they are in peacetime - to fight the common enemy; nuclear fire. Joint urban-rural planning and training will be necessary to prepare for this catastrophic eventuality, especially in areas where rural fuels capable of spreading fire are adjacent to urban areas.

^{1/} Strope and Christian, TR-25, July 1964, Fire Aspects of Civil Defense.

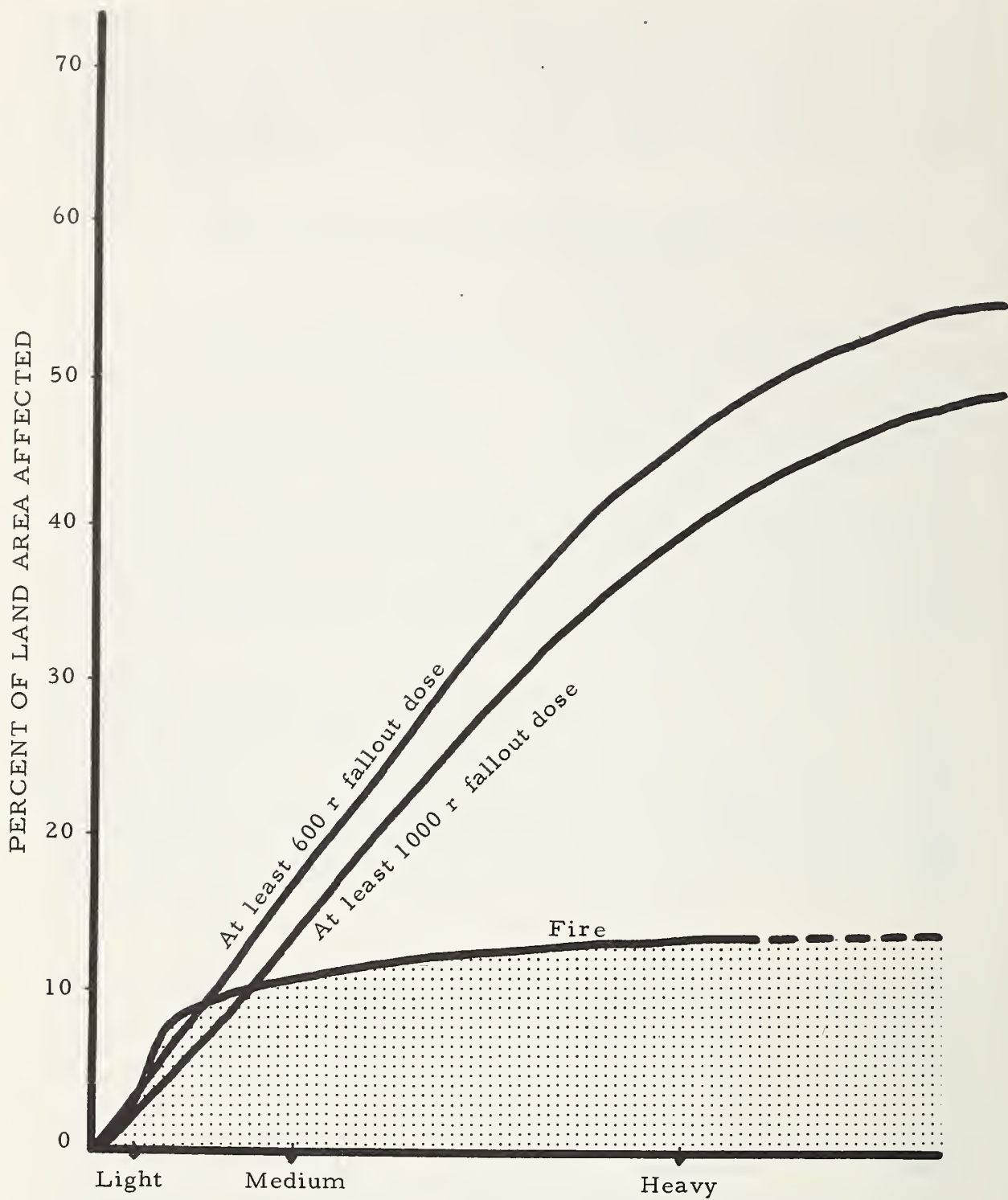


Figure 1. Effects of nuclear attack on total land area of the United States.

EXISTING FIRE CONTROL CAPABILITIES CAN BE EXPANDED TO LIMIT THE NUCLEAR FIRE THREAT

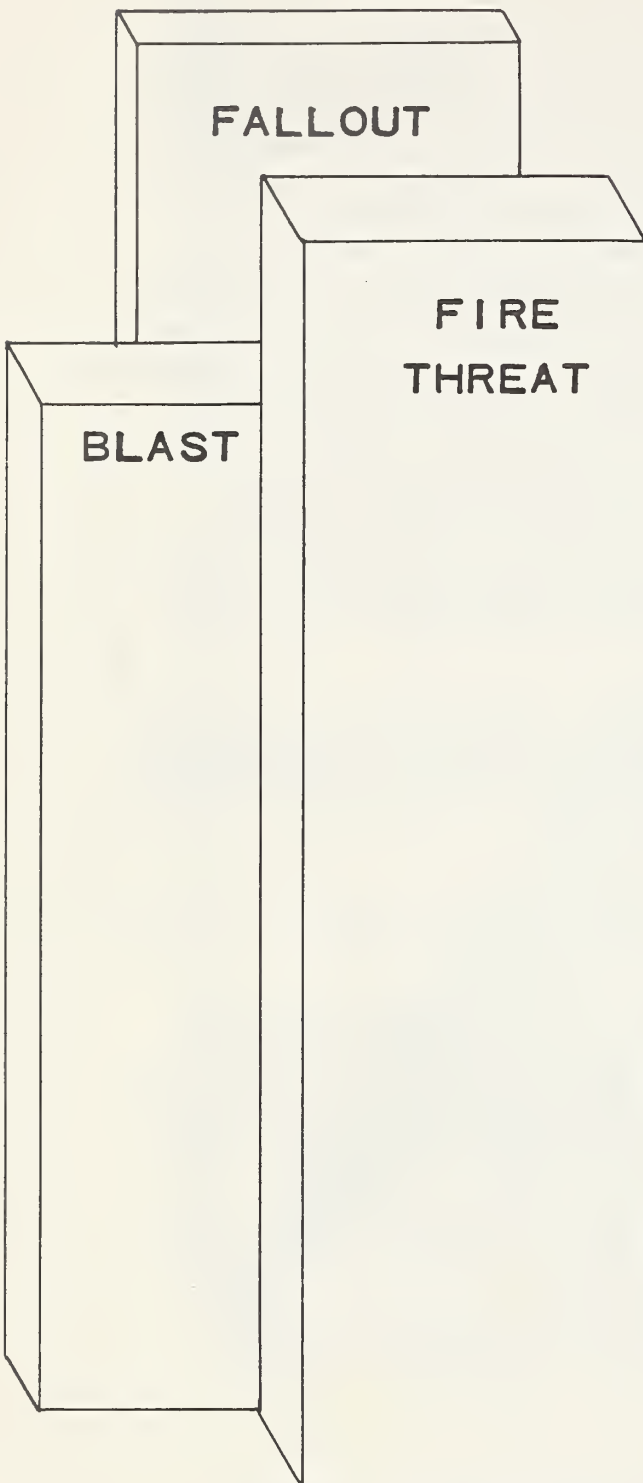
Except for approximately 500 million acres of rural land with inadequate or no fire protection, organized fire services in the United States are effectively protecting urban and rural areas from fire, including fire disasters typically experienced by their communities in peacetime. Personnel of these services are competent firemen, equipped and trained to act independently and effectively. Given guidance, support, and training in the nuclear aspects of fire, these firemen can provide fire defense leadership to the public and take preparedness, selective fire control, and related rescue actions that will reduce the nuclear fire threat significantly. The foundation of our Nation's strength for fire defense in nuclear war is the organized fire services; since it is these firemen, plus the populace, that must face the fire threat independently until it is possible to arrange aid to stricken communities. Gaining understanding by public officials and the citizenry of the magnitude and complexity of the nuclear fire problem is a necessary first step in preparing to reduce the fire threat. Such understanding is not presently widespread in the United States.

By using existing fire protection capability as the foundation, effective fire defense readiness can be developed through training, nuclear fire analysis of each community, fire defense plans, and protective measures as shown in Figure 2.

THREE PROGRAMS PROVIDE ALTERNATIVES

Protective measures, support activities, and training needed in addition to peacetime capabilities to reduce the threat from nuclear fire were identified during the study, cost-effectiveness analysis made, and those measures showing the most promise were combined into three alternative fire defense programs. These programs - (1) Austere (2) Moderate, and (3) Comprehensive - comprise different degrees of preparedness depending upon the amount of effort and funds that can be devoted to fire defense.

NUCLEAR THREAT



RESPONSE SYSTEM

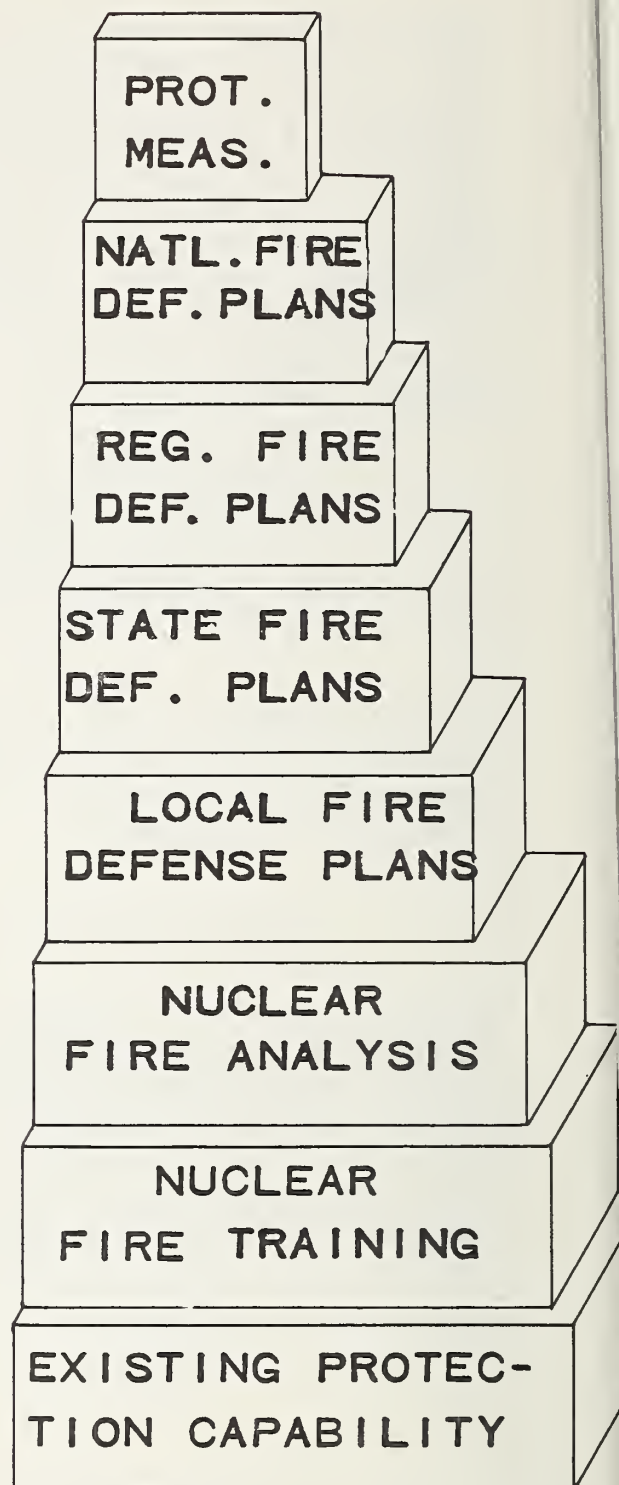


Figure 2

The Austere Program includes only the most basic and less costly measures. TV and radio instruction kits would be prepared and kept in readiness at nationwide networks and key locations in each state, to be used as needed to inform citizens what to do to protect their homes and communities from nuclear fire. Simple window shielding would be designed and used for homes, places of business and fallout shelters in potential target areas to prevent thermal flash from igniting home furnishings. Guidelines would be prepared and a program developed to inspect and rate the fire vulnerability of fallout shelters. Ongoing development of capability to map fires with infrared equipment would be continued.

Support activities to be employed jointly by OCD, state and local governments, and Federal agencies would include a Nuclear Fire Analysis^{1/} of each community, Fire Defense Plans for national, regional, state, and local levels of government, preparation of guidelines for community planning to reduce the fire vulnerability of cities, and studies to improve nationwide fire intelligence and communication systems.

Training would prepare a minimum number of firemen, public officials, and citizens to protect fallout shelters and critical resources from fire. A National Nuclear Fire Leadership Training Program would qualify a nationwide cadre of leaders for the fire defense program. The ongoing Rural Fire Defense Training would continue at about the present pace.

The Moderate and Comprehensive programs contain the elements of the Austere program and, in addition: more effective shielding for windows; reduction of thermal effects in potential target areas by using smoke screens; studies to determine the effectiveness of aerial fire retardants for protecting fallout shelters; professional fire staff and a technical staff support center at the national level; preparation of a standard fire service terminology; preparation of a fire service radio-operating procedures handbook; a study of special equipment needs to suppress nuclear fire, and more comprehensive training programs. Implementation time is compressed in the Moderate and Comprehensive programs to obtain a greater state of readiness sooner than in the Austere program.

^{1/} The Nuclear Fire Analysis would be an examination of the nuclear fire threat to each community, an inventory of each communities' capability to cope with the threat, and an evaluation of the effectiveness of alternative protective measures.

A NATIONAL FIRE DEFENSE PROGRAM IS UNDERWAY

As the fire study nears its final Phase, preparations to carry out a nationwide program for fire defense in a nuclear attack have already begun. The Office of Civil Defense budget for Fiscal Year 1966 contains funds for important elements. OCD now has the following Fire Defense System elements under consideration for programming:

TV and Radio Information Kits.--

Prepare the TV and radio kits to be used to instruct citizens in fire defense.

Householder Fire Extinguishing and Prevention Training.--

Prepare training materials to be used by local officials to train citizens in home fire prevention and firefighting.

Urban Fire Defense Support Firemen Training.--

Prepare materials for use in training urban residents to organize and lead small groups in suppression of small fires, to assist professional firemen as needed, and to help defend fallout shelters from fire.

Shelter Fire Guard Training.--

Prepare a kit for use in training fire guards to supervise the fire defense of each shelter.

Basic Nuclear Fire Leadership Training.--

Prepare materials to train supervisory firemen and other fire leaders in the severity and complexity of the nuclear fire threat.

Advanced Nuclear Fire Leadership Training.--

Prepare materials to train fire leaders and other defense officials to plan and implement programs of fire defense for regions and states.

Rural Fire Defense Training.--

Continue cooperation with the Forest Service to expand the ongoing rural fire defense pilot project.

Infrared Mapping of Nuclear Fires.--

Continue ongoing OCD-FS program to develop operational capability.

TASKS AHEAD IN THE FIRE STUDY

During the remainder of the fire study, recommendations on how to implement the approved fire defense program will be developed. Analysis of research findings made since Phase One will be used to update the description of the nuclear fire problem. Instructions for fire defense will be prepared and, after approval by OCD, will become chapters and appendixes in the Federal Civil Defense Guide. A combined Urban-Rural National Fire Defense Plan will be prepared and recommended to OCD. Proto-type equipment will be developed to help fire dispatchers and managers inventory, dispatch, and assign fire control resources during nuclear attack or peacetime emergencies. As in Phase One, fire experts from urban and rural fire services have teamed up with forest personnel to solve problems and develop recommendations. This cooperative effort will continue throughout the study. The study should be finished and a final report written by the end of May 1966. This report, and the Phase One Report already prepared, will provide a sound technical basis for defending the United States from nuclear fire.

